

CHAPTER I

INTRODUCTION

1.1 Background

Strawberries are unique among cultivated temperate fruit. They are a herbaceous perennial, which requires different culture from the cane, bush, and tree fruits. They are the quickest plant to produce fruit from the time of planting (Jackson, 1986). Strawberries are found in many different areas, where there are different temperatures, soil types and so on. Some varieties can grow in Alaska as well as in Equator (Pipadtanawong, 1998). It is also a commercial fruit crop in Europe, America and Asia.

In Thailand, the strawberry was introduced as a strategic crop in highland agricultural development. The Royal Project Foundation (RPF) and Kasetsart University (Department of Horticulture, in the Faculty of Agriculture, and the Faculty of Forestry) have carried research on strawberry production intensely since 1969.

Even though the strawberry is not native to Thailand, it has become a commercial fruit crop in the Chiang Mai and Chiang Rai provinces. Evidently, this was the Royal Project effect spent on promotion the crop to hill-tribe farmers to replace opium cultivation and deforestation since 1974 (Sukumonnun, 1988). As a temperate fruit crop, which can grow well there, strawberry was found highly potential fruit crop in both provinces in the early stage of the crop introduction. Between 1983 to 1984, comparative studies showed the rates of return from strawberry cultivation at Changkean gardens in Chiang Mai and Chiang Rai provinces were 203.6 % and 248.1 % respectively. However, the increasing cost of production between 1983/84 was blamed as the reason

for the low of return in Chiang Mai (Techopraseart, 1985). In the cropping year 1993-1994, Nonllha (1995) reported that rate of return of strawberry production was 19.32% and 20.48% in Chiang Mai and Chiang Rai respectively.

Per rai strawberry production costs were estimated at 31,060 baht, the major strawberry producing site of the Royal Project at Tong Rawl (Royal project 1996). As the labor, the above cost did not include the labor the households provided fairly. The incomes from strawberry production varied depending on the type of variety, for example, the B35 variety provided 75,846 bath/rai, whereas the B16 variety provided only 3,794 baht/rai, which is amazingly lower than the B35 variety.

According to the Office of Chiang Mai Agricultural Economics, the commercial area for strawberry cultivation was 2,900 rai in 1996/97. Almost 80 % of the production was used for processing strawberries into different forms such as frozen, juice, dried, jam and paste; 20 % was sold as fresh strawberries.

The price of strawberries depends on when and where farmers sell their produce. For example, in the early season of 1996, farmers enjoyed a good price of about 60-80 bath/kg. In general, farmers sell their products at fresh fruit markets and processing markets. The price in the fresh fruit market is higher than in that of the processing market. The quality of strawberries can be classified into 3 grades with different prices. In 1997, price of grade A, B, processing grade were 40-45, 25-30 and 8-12 baht/kg respectively. (Office of Chiang Mai Agricultural Economic, 1997).

Thailand also exports frozen and fresh strawberries. Japan has been the major importer of Thai strawberries for many years. In 1997, the total Thai export value of

strawberries was 717,276 million baht of which 716.569 million baht came from the exports sent to Japan. (Dept. of Business Economics, 1998).

1.2 Strawberry variety

Originally, the strawberry was a short day plant, which develops a flower bud under short daylight and low temperature. It is classified as a Junebearing strawberry. Otherwise, strawberry varieties are categorized as the following: Everbearers, or Day-neutrals based on photoperiodic responses, especially when flower bud formation can occur under a long daylight if the temperature is below 16 °c. Everbearers are classified as long day plants because they primarily initiate flower buds when daylight exceeds 12 hours. Day-neutral selections may be identified by runner time as they flower within 3 months from the runner appears, whereas Junebearers and Everbearers do not. It is not known if the temperature affects the growing of the flower bud of Everbearers or Day-neutrals. Runner production is the greatest for all types under the long daylight type, which followed by the night interruption then by short daylight. Everbearers produce more runners than other types (Durner, 1984).

Since 1969 to 1998, many strawberry varieties have been brought to Thailand. Cambridge Favorite, Tioga and Sequaio varieties (namely by Phraradchatan 13, 16 and 20, respectively) was selected to grow in Chiang Mai and Chiang Rai in 1972. After that Tioga variety was found that it could be adjusted in upland 1,200 msl and lowland of both the provinces. In general, most farmers grew only this variety until in 1985, Akio Pajaro and Douglas from United States were grown and experimented in the Intranoon Royal Project Foundation Station. This study result was not achieved. The next year, Nyoha, Toyonaka and Aiberry were brought from Japan in order to experiment adjusting ability

with environment at this station. There are 2 varieties as Nyoha and Toyonoka, which can adjust with this environment. So, both varieties have been promoted to farmers (Pipadtanawong, 2000).

At present, the commercial strawberry varieties occupy within Phraradchatan 16¹, 20², 70³, and 50⁴, Nyoho, and Selva. Most of them are Junebearing strawberries, unlike the Selva a day-neutral plant. These varieties produce runners under long daylight and flower bud formation under low temperature and short daylight. The P70, P50 and P20 varieties are produced for the fresh fruit market. P16 and Selva varieties are suitable varieties for the processing market.

1.2.1 Phraradchatan 16 variety

The Tioga or Phraradchatan 16 variety is a variety promoted to the farmer for a long time. It can grow in many areas widely, particularly the upland. Moreover, it can be grown in the lowland in Chiang Mai and Chiang Rai provinces. The fruit size is middle to large and its production yields are the highest among the varieties of strawberries in Thailand. The fruit is firm so that it can be transported long distances (Sukumonnun, 1987). The Tioga has been a commercial variety for several years in both the fresh fruit market and in the industrial market.

According the office of Chiang Mai Provincial Commerce the production yields in 1994/1995 of Samoeng, Fang and Mae Rim were 5,000, 3,000 and 2,700 kg per rai respectively.

¹ Tioga (P16)

² Sequoia (P20)

³ Toyonoa (P70)

⁴ Variety was bred by Dr.Prasartpore Smithaman

1.2.2 Phraradchatan 20 variety

The Phraradchatan 20 or Sequoia variety is a June-bearing strawberry. In 1972, it was selected with the Tioga as a variety introduced to extend production in the lowland of Chiang Mai. It can grow well in the high land at altitudes above 1,500 meters. Its characteristic berries are large in size, conic to long conic in shape, bright red but soon turning dark red and with soft flesh. Its berries have fragrance and sweet taste (Sukumonnun, 1988).

1.2.3 Phraradchatan 50 variety

The Phraradchatan 50 was bred in the United States of America. Then it was pollinated and selected in the Tissue Culture Research Unit of the Royal Project Foundation. It can grow at 15 to 28 ° C in the lowland and the highland. It has been introduced and promoted to the farmers through the Royal Project Foundation since 1997. The characteristics of the berries are medium to large size, red to dark red, conic to long wedge shape, sweet taste and fragrance. This variety is propagated by using tissue culture technique in order to develop the mother plants as virus-free plants (Smithaman, 1997).

1.2.4 Phraradchatan 70 variety

The Toyonaka or Phraradchatan 70 variety originated in Japan. It was introduced and variety tested since 1986 in Thailand. However, it was not a commercial variety (in the beginning because the production yield and its growth was not satisfying). because at first of the beginning, production yield and its growth was not satisfied. However, hill-tribes in the Intanon harvested the production in order to sell them to travelers. It has a good fragrance and sweet taste (Pipadtanawong, 1997).

1.2.5 Selva variety

The Selva variety, which originated in the United State of America, was classified as the first commercial day-neutral type in California in 1983. It has been distributed to several production areas widely in the world. This variety is introduced for off-season production and its production has been produced for the fresh fruit and processing market. The Selva variety is different from Everbearing varieties and other Day-neutral varieties. Its strong point is that it produces a large fruit, which is conic to wedge shape, but its crown is small. Otherwise, the ability of runner production is quite good. And it was found that in the propagation period, the mother plants and the first runners have always flowered. According to many reports the strawberry fruits of the salva are the biggest size among the day-neutral varieties. Therefore, it is the reason why it is produced widely. However, its fruits are quite strong and its taste is not so good so it is suitable for industrial use (Pipadtanawong, 1998).

In Thailand, the Salva has been experimented within Chiang Mai province since 1995. The result of this experiment was not satisfied when it was compared with the other varieties such as P16 and P20 (Pipadtanawong, 1998).

1.3 Rationale

Even though, the strawberry is a commercial fruit crop in Chiang Mai and Chiang Rai, the production areas have decreased gradually since 1995 because of the increased cost of fertilizers, chemicals (pesticides and fungicides) and labor. Farmers prefer to grow flower to strawberry because they can get higher return. Moreover, farmers lack in good strawberry varieties and virus-free runners. The fact that strawberries are sensitive to pathogens makes farmers use more chemicals in order to control diseases. Therefore,

the project entitled “Commercial Strawberry Production by Using Certified Seedlings (CSPUCS)” is being carried out in Chiang Mai with the aim to solve these problems. This project has been funded by National Center for Genetic Engineering and Biotechnology (BIOTEC).

Socioeconomic analysis is needed to fully assess the potential benefits and shortcomings of biotechnology as applied to agricultural research. National-level contributions to this effort help to ensure that the analysis is undertaken in agreement with national objectives and is aimed towards the users identified as most needy of the products derived from the biotechnology initiative. Discussions at the national level of the socioeconomic analysis also provides guidance for sector and program leaders as well as for clients. These will ,of course, need verification with local client groups.

1.4 Objectives of the study

The general objectives of this study are to evaluate the socioeconomic impact of commercial strawberry production using certified seedlings. The specific objectives are as follows:

1. To compare the production systems of runners and strawberries between existing and virus-free systems.
2. To analyze change in profitability and producer surplus and the social impact of using a virus-free system
3. To investigate the possibility of expanding production of virus-free runner production by farmers.
4. To investigate attitudes of consumers, processors, and exporters about strawberry qualities.

5. To determine factors affecting the price of strawberries.

1.5 Usefulness of the study

The result of this study is expected to be useful and helpful for farmers, policy makers, and relevant agencies to develop and provide necessary information about strawberry and runner production systems between the original or normal system and the certified or virus-free systems. The results of the comparative analysis of the study such as profitability, budget, and farmer surplus among different groups of farmers will be useful for farmers in making production decisions, and relevant agencies for initiating development programs. Information on the possibility of expanding free virus runner production by farmers will be helpful for future development of strawberry production. On the other hand, information on consumers', processors' and exporters' preference for qualities of strawberries will be helpful for biotechnology in developing new strawberry varieties preferred by different groups of people.